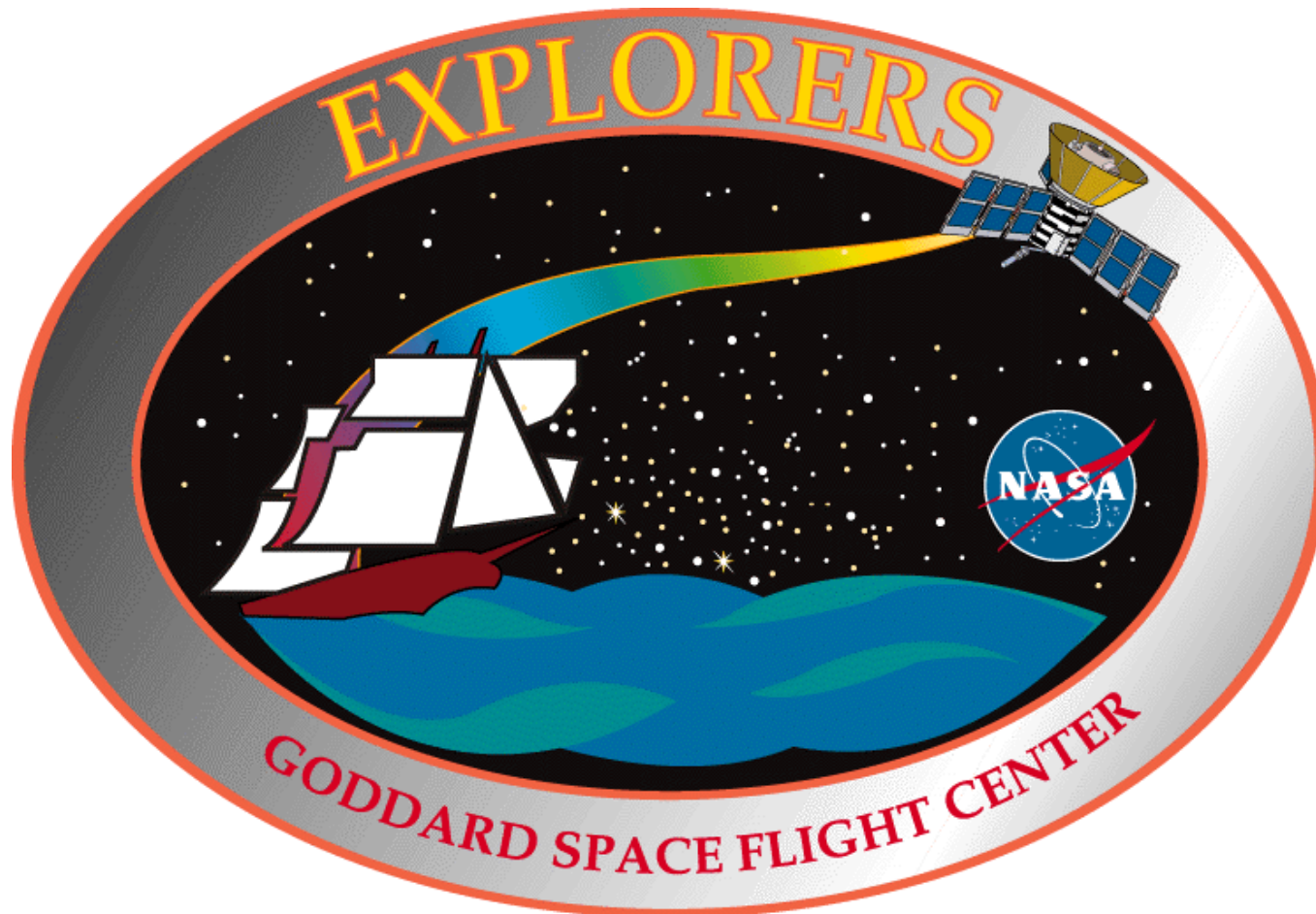


MIDEX Pre-Proposal Conference

Safety, Reliability, & Quality Assurance Handout

Rick Claffy, GSFC Code 410/303, X6-7866



August 10th, 2001 @ UMD

MIDEX Pre-Proposal Meeting SR&QA Handout

- **SR&QA effort is controlled by MIDEX AO, EPL Reference Document #32, containing both Requirements & Guidelines.**
 - Page 7, Par. 2.1 discusses EXP Program Office & PI joint effort to define best mix of roles and responsibilities for SR&QA execution.
 - Mission Definition & Requirements Agreement. (EPL Ref. #39)
 - Code 410/PI SR&QA Insight Agreement.
 - Becomes part of GSFC/PI Contract and a condition for mission confirmation.
 - Defines Early the Inter-Institutional Partnering Arrangement for SR&QA services.
 - Par. 2.1 requires PIs to implement a product assurance program consistent with ISO 9000 series ANSI/ASQC Q9001-1994, covering flight hardware, software & GSE.
 - ISO registration not required, but compliance is expected with the Standard's sections where it makes good engineering and programmatic sense.
 - PI SR&QA Program must meet MIDEX Safety, Reliability, and Quality Assurance Requirements, as published in AO Document #32.
 - PI Institution Quality Manual is deliverable for Explorers Program Office Review/Comment during Phase B.
 - Tailoring allowed in most assurance technology areas, but ...
 - The highly specialized discipline of System Safety, including the Range Safety effort, is dictated external to GSFC. Expert guidance through the process has historically been needed by PI teams.

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- **The MIDEX SR&QA Requirements document also addresses Missions of Opportunity, LDB Missions, NSTS Payloads.**
 - **Permits further tailoring for reduced scope of MOs.**
 - **Shuttle proposers should refer to EPL Doc #34 for System Safety scope & resulting cost planning.**
 - **LDB Proposers to use Balloon Appendix to Document #32.**
- **MIDEX SR&QA document Highlights:**
 - **Requires Monthly Assurance Status Reports.**
 - **Requires supplier audits.**
 - **Requires a PI Failure Reporting System for Phase C/D/E.**
 - **Invokes Hi-Reliability Workmanship standards.**
 - **Requires flight Printed Wiring Board Coupon DPA by certified facility prior to population with flight EEE parts.**

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- **Lays out Design Review Requirements.**
 - Peer Review heavy emphasis, with organized tracking of RFAs.
 - System level Review process currently being integrated with NASA independent Red Team functions per HQ Direction.
- **Details specific System Safety program requirements and deliverables with process flow descriptions (EPL Docs. #33-36).**
 - Magnitude of System Safety effort must not be under-estimated.
 - Allocate/identify roles & resources.
 - Start early.
 - GSFC can help in numerous ways.
- **EEE Parts criteria per GSFC 311-INST-001, Rev- for Grade 3.**
 - PI shall maintain and review Parts Lists with GSFC.
 - PI shall use an organized system to manage parts application, evaluation, and traceability.
 - GSFC PMC requires all GSFC managed missions to provide GIDEP Alert and NASA Advisory responses.

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- Standard Materials and Processes program required, including Contamination Controls.**
- Reliability**
 - Risk assessments made and mitigation strategies identified.
 - FMEAs at subsystem/box level.
- Software**
 - Code to be structured, error free, and maintainable.
 - Establish & document SW requirements, external interface specs, user guides.
 - Internal (peer) and external software design reviews.
 - Use of SW Quality Metrics & Complexity analyses to augment IV&V.
- Verification**
 - Verification/test program to ensure all mission requirements are met.
 - Documentation to include verification matrix, environments matrix, and test procedures.

MIDEX Pre-Proposal Meeting SR&QA Handout

- **Special Attention NIAT Requirements Topics:**
 - **Red Team Component of Integrated System Level Reviews.**
 - Reviewer expectations can exceed baseline review requirements.
 - Extended scope, detailed questions.
 - RFA trail & Failure Report closures thoroughly checked by Red Team.
 - NASA Policy has shifted to Code 301 Chairing of all System Level Reviews for PI Missions.
 - **Heavy Reliability Emphasis On:**
 - Probabilistic Risk Assessment (PRA) Recommend Start in Ph A.
 - Fault Tree Analysis, Event Sequence Diagrams, etc.
 - FMEA @ subsystem level.
 - Identify all single string design features.
 - Failure Impacts/mitigation.
 - **Tangible Continuous Risk Tracking & Management System.**
 - **PI Software QA effort and IV&V.**
 - Each mission evaluated for SW complexity/risk/need.
 - Determination of appropriate level of NASA IV&V Facility involvement via standardized criteria.
- **Mission Success is GSFC Center Director's Ultimate Responsibility to NASA Administrator.**